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Better control of diseases that pass between animals and people

Livestock can be highly effective forces for good, such as by enhancing food and nutritional security and providing incomes for the poor. But they can also have detrimental impacts on public and environmental health. The annual costs of infectious diseases that spread from livestock to people is around USD 125 billion per year. These largely neglected diseases, which mostly affect the poor in developing countries, also represent a potential threat to rich countries.

Positive and negative aspects

Livestock can have very positive impacts on people's lives. Around a billion of the poorest people on the planet depend on livestock for their livelihoods. As the very poor become less poor and eat more milk, meat and eggs, the nutrients in these foods contribute to better health and enable their children to develop normally and fulfil their potential. Demand for livestock products is growing very rapidly in developing countries, driven by population growth, urbanisation and increased incomes. Meeting that demand offers real opportunities for poor livestock keepers and small-scale traders and processors – a potential pathway from poverty.

But livestock can also have significant negative impacts on public and environmental health. For example, sixty percent of all human infectious diseases are zoonotic – that is they are spread to people from animals (and vice versa). Although wildlife is also implicated, many human infections come from the world's 24 billion farm animals.

The costs on the poor are very high

ILRI has shown that in poor countries, at least one in seven cattle, sheep, goats, pigs and poultry are affected by zoonotic diseases each year – which not only reduces their productivity, resulting in less meat, milk and eggs, but also represents a direct threat to human health and life. About 27% of livestock in developing countries show signs of current or past infection with bacterial diseases that result in contaminated meat, milk and eggs.

Sick people cannot work and the death of a working adult has huge impacts on those left behind.

The main burden of zoonotic disease falls on the shoulders of the poor, especially the one billion of the world's poorest citizens who depend on livestock for their livelihoods. The headline figure above of USD 125 billion total cost comprises response and resources valued at USD 10 billion, averting pandemics 30 billion and controlling zoonoses 85 billion. Further, the occurrence, or even suspicion, of zoonotic diseases can also result in export trade restrictions, which can impact not only on households and jobs, but also on national economies.

In short, zoonotic diseases are a major reason why many poor livestock keepers stay poor.

But rich people can suffer too

The United States, Western Europe, Brazil and Southeast Asia are all hotspots of emerging zoonoses – some of which are becoming more virulent or are newly drug resistant.

Exploding global demand for livestock products, especially in the rapidly emerging economies such as China and India, is likely to fuel the spread of a wider range of zoonotic diseases.

A recent ILRI-led study revealed that zoonotic diseases – including such scourges as bovine TB, brucellosis and pig tapeworm – cause 2.5 billion human illnesses and 2.7 million deaths every year. An 'unlucky 13' zoonotic diseases account for the vast majority of these cases. More than a third of global diarrheal diseases in people have been attributed to animals or animal agriculture, making this the biggest zoonotic threat to public health.

Coordination of effort is essential

ILRI is helping to lead a 'One Health' approach for diseases that pass between animals and people. This brings together people from the medical, veterinary and environmental sectors – currently, these sectors mostly work independently of each other. Analysis by ILRI researchers shows that there are significant benefits to be reaped from a coordinated approach: every dollar invested in One Health could yield five dollars of benefits.

Increased investment in One Health on a large scale therefore has the potential to transform the management of emerging and neglected zoonotic diseases, saving the lives of millions of people and animals, massively reducing the burden these diseases place on poor people, and minimising the risks faced by people in wealthier countries.

Disease maps are a very valuable tool

A 2012 mapping study carried out by ILRI has revealed some particular zoonoses 'hotspots': Ethiopia, Nigeria and Tanzania in Africa, and India in Asia, have the highest burden of zoonotic diseases causing illness and death. It makes sense, therefore, to focus measures to improve disease prevention and control in these unlucky countries.

Knowing about the global distribution of livestock is also very useful. A recent pivotal study led by ILRI has built on prior work by others and mapped the world's livestock to very high accuracy – a spatial resolution of just 1 square kilometre for cattle, pigs, chickens and (partially) ducks.

These maps will be key to studying disease risk and estimating the impacts of diseases – not only in livestock, but also for those zoonotic diseases that spill over into the human population.

ILRI's work on zoonotic diseases

ILRI's current work in this area is in four major areas: emerging infectious diseases, food safety, neglected zoonoses and One Health/Ecohealth. Livestock foods are amongst the riskiest food types in terms of food-borne disease, while diseases associated with agricultural intensification include malaria, resulting from creation of irrigation dams, with the unintended consequence of also creating habitat for mosquitoes to breed.

A particular focus for ILRI is approaches to food safety and disease control that can work in informal markets and marginal areas - the places where the poor buy and sell food, farm and live. This involves testing and adapting appropriate options for food safety assurance and control of zoonotic diseases within the context of developing countries.

Two examples

1. A five-year project in six countries in Southeast Asia: Cambodia, China, Indonesia, Laos, Thailand and Vietnam. The project generated useful lessons on a One Health approach to zoonoses control that combines human, animal and environmental health aspects, and it built on-the-ground capacity in these countries to do so.
2. A participatory rural surveillance and appraisal method to collect information about diseases to inform decision-making and action – by involving livestock owners and community members as well as health and other professionals. This approach was applied in Africa and Asia as part of emergency programs to address the highly pathogenic avian influenza (bird flu) pandemic. This resulted in markedly increased case detection in countries experiencing bird flu, and a better understanding of the situation.

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